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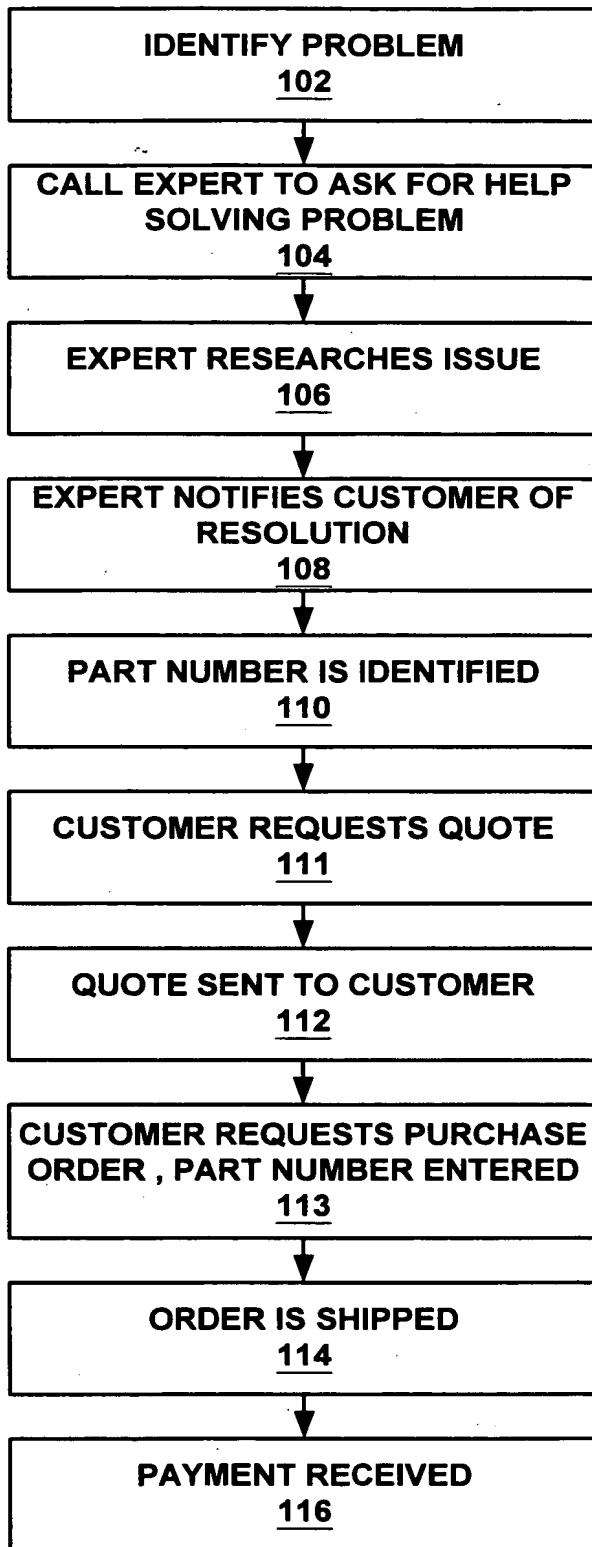
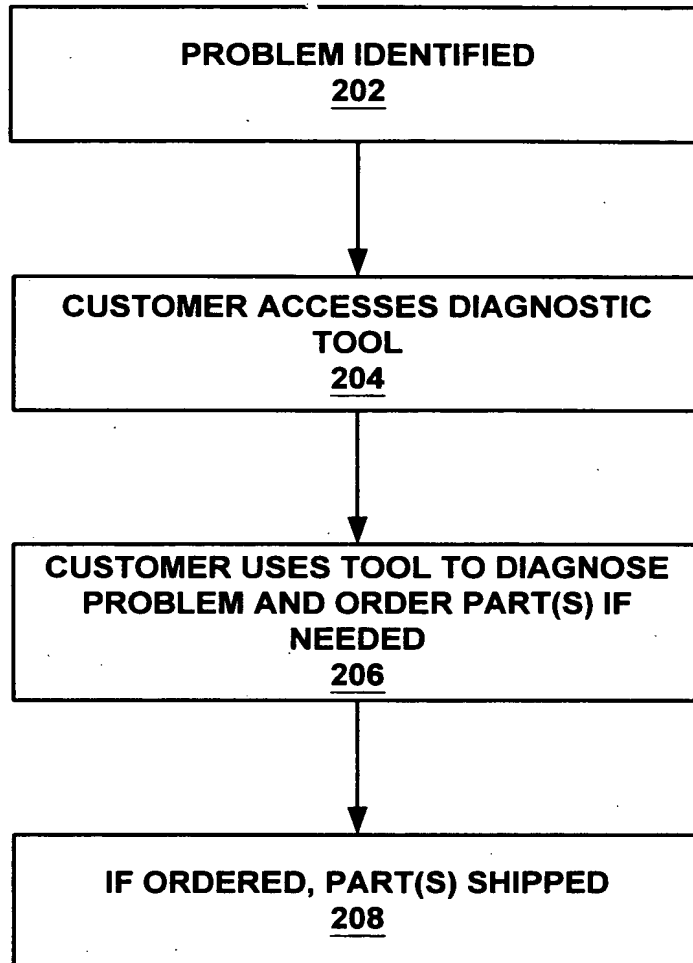


FIGURE 1 (PRIOR ART)

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**FIGURE 2**

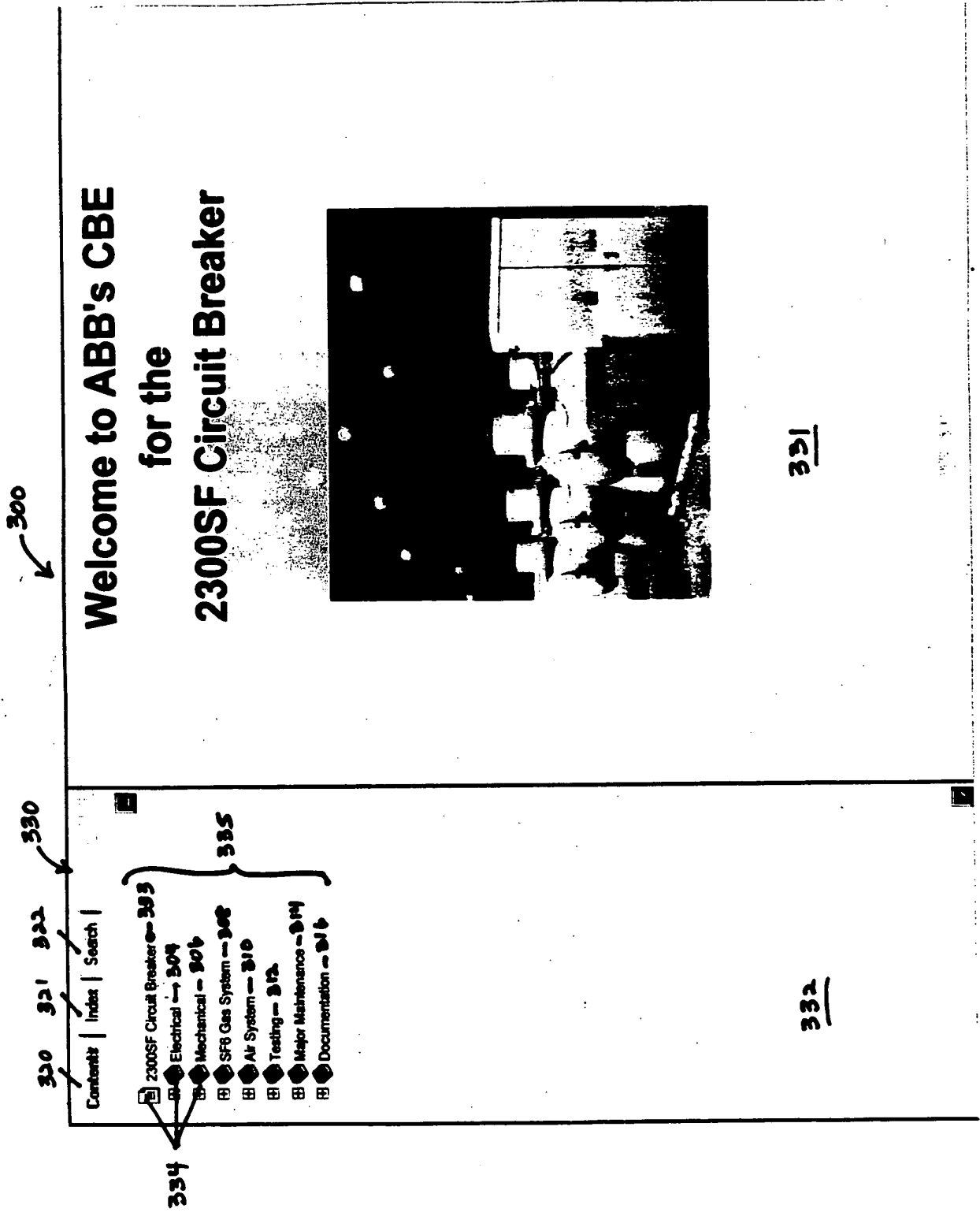


FIGURE 3

400a

403a

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Current Transformer

Mechanical

SF6 Gas System

Air System

Testing

Major Maintenance


Documentation

2300SF Fails to move to closed position

402a

Breaker fails to move to the closed position (Breaker does not move)

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Do these steps in order and try to operate the breaker at least 5 times at normal operating pressure after each step or until the unit fails to operate once:

I. Verify there is proper voltage. — 420

422

A. Check the voltage. Verify there is proper voltage on the output side of the fused knife switches or the circuit breakers on the control panel. If there is proper voltage, then proceed to the following steps.

424

II. Verify the closing relay (x-relay) is operating properly. Schematic — 426

428

A. Check the closing relay (x-relay). Determine if there is an open circuit in the coil or if the contacts of the x-relay in the closing circuit are burned or have a high resistance when closed. If either of these conditions exist, replace the contact of the coil. Provide the serial number of the breaker so that the proper coil or contact can be identified.

430

III. Verify the pilot valve is operating properly.

A. Check the pilot valve for A) An open circuit coil B) A sticking pilot valve C) A defective solenoid. If the pilot valve is sticking, operate the breaker by depressing the manual operating button to determine if this eliminates the problem. Over the years, there were three different pilot valves applied to this breaker. One was the Westinghouse valve, the second was a Ross valve, and

FIGURE 4a

Sheet 1 of 4  
Docket No: ABHS-0158  
Title: Systems and Methods for a Knowledge-Based  
Power Assembly System Component Diagnostic Tool  
Application No.: Not yet assigned  
Inventors: Lachimia et al.

2300SF Fails to move to closed position

# Breaker fails to move to the closed position (Breaker does not move)



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## III. Verify the pilot valve is operating properly.

- A. Check the pilot valve for A) An open circuit coil B) A sticking pilot valve C) A defective solenoid. If the pilot valve is sticking, operate the breaker by depressing the manual operating button to determine if this eliminates the problem. Over the years, there were three different pilot valves applied to this breaker. One was the Westinghouse valve, the second was a Ross valve, and the third was a Norgren valve. Neither these valves nor their spare parts are supplied. The replacement for all of these valves is the ABB pilot valve P/N 5881B81091. If the pilot valve is an ABB pilot valve, and the coil has an open circuit, replace the coil with ABB # 4044B76H02 (6volt, 8watts). If the coil has continuity, but there is no air flow through the pilot valve when the coil is energized, replace the solenoid with ABB # 4044B76H01. If it is determined that it is necessary to replace the solenoid and coil as an assembly, order ABB # 4044B76G01.

indication of continuity, verify that the latch check switch is adjusted properly. See VIII. B for adjustment procedure.

Replace with ABB # 8931Q34G05. 452

451

roller lever should be .030" +/- .005". See video. Note - Do NOT adjust the small elastic stop nut at the top of the resilient stop assembly. This adjustment is to preset the compression on the rubber member inside of the resilient stop assembly. If it has been disturbed, or to check for proper adjustment, the hole for the spanner wrench in the head of the piston assembly should be even with the housing. 453

- i. Be certain the mounting bolts of the trip unit are tight. Then adjust the trip unit. The air gap for the trip armature should be approximately 3/16". This adjustment is made by varying the height of the resilient stop bar. 454

455

FIGURE 4b

2300SF Moisture content

**Moisture content**

**I. Low pressure system**

- A. The moisture content in the SF6 low pressure system should be below 300 ppm. If the moisture exceeds this, the gas must be dried. Refer to the appropriate instruction book for the drying procedure as identified on the breaker nameplate.

**II. High pressure system**

- A. The moisture content in the SF6 high pressure system should be less than 60 ppm. Refer to the appropriate instruction book for the drying procedure as identified on the breaker nameplate.

**III. See the field advisory on moisture content in the 2300SF/ 2429F circuit breaker.**

456

1. Verify the accelerating spring going solid. To do this, close the breaker and measure the dimension from the outside of the spring plate to the outside of the accelerating spring cover ("X"). Then measure the dimension from the outside of the accelerating spring cover to the lever box ("Y"). Subtract "X" from "Y". The dimension should be no less than 13 1/4". If it is less, there is a possibility the spring is going solid. This is not a good condition since it may cause the spring to become weak. Drawing 457

- c. The instruction book for reference is IB # 33-456-C4H. — 458

13. Perform timing tests as indicated in section 8 of FPE 89-5. — 459

**FIGURE 4c**

## PILOT VALVE & ADAPTER KIT 5861B81G01

For all AA-7, AA-10, AA-14, & CAS-8 Mechanism Control Valves on  
Oil Circuit Breakers  
and

138 / 230 kV Dead Tank Gas Breakers with 'AA-10R80' Mechanisms\*

- \* Except 362kV and above of Type 'SF' and 'SFA' Gas Circuit Breakers  
with 'AH-7' and 'AH-10' Mechanisms

### Kit Description

This kit contains parts and instructions for easy replacement of obsolete pilot valves used on control valves on the above mechanisms on oil and gas circuit breakers. The kit contains all parts and adapters necessary to install the modern 'ABB' pilot valve which is included. An adjustable resistor is supplied to reduce the closing control voltages for 48, 125, and 250 VDC applications. Connection instructions are illustrated on Page 9. A manual override push button is located on the pilot valve on the opposite side of the solenoid coil. The coil and push button location is reversible if so desired.

### Safety Precautions

Safe operating practices should be followed at all times when performing maintenance on the breaker.

Before starting the pilot valve replacement procedure, be sure to:

1. Place the breaker in the open position
2. Isolate the breaker from the system by opening the disconnect switches
3. Solidly ground all bushings
4. Remove all AC and DC power from the breaker
5. Open the air reservoir drain valve and exhaust the air to zero psig

### Illustrated Parts Assembly

Find the page with an illustration that matches your mechanism and pilot valve combination among the enclosed pages. Some of the later vintage mechanisms may have Norgren pilot valves and adapters. Discard these parts and replace as shown. Connect the pilot valve coil as shown on Page 9.

FIGURE 5a



# "AA-7" MECH WITH "ROSS" CONTROL VALVE

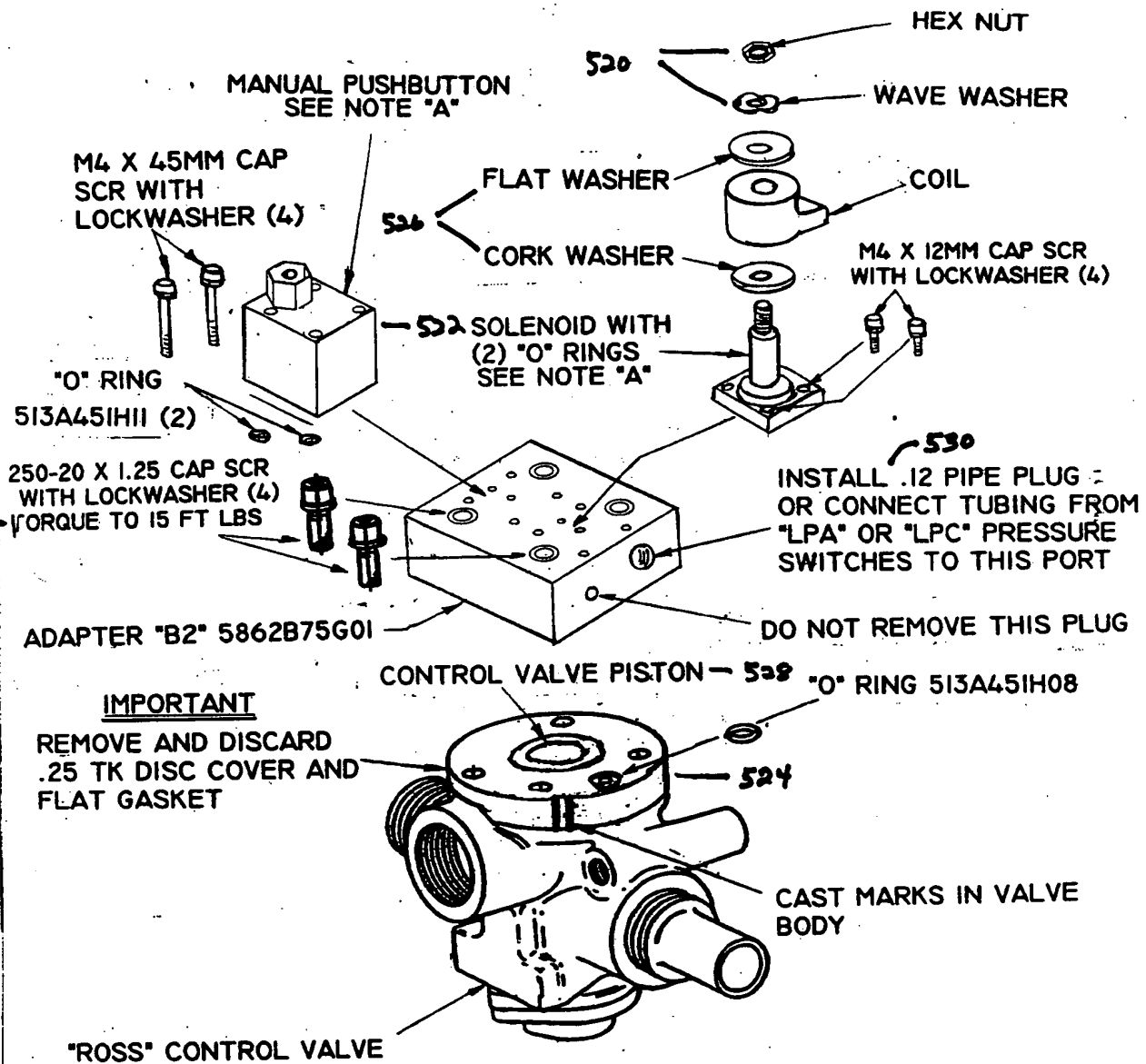


FIGURE 5b

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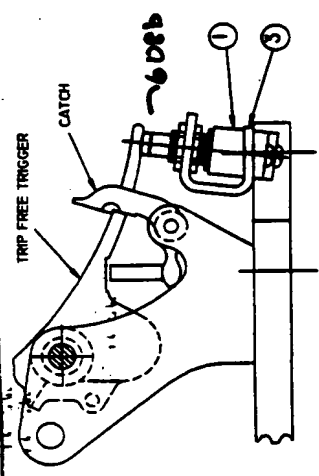
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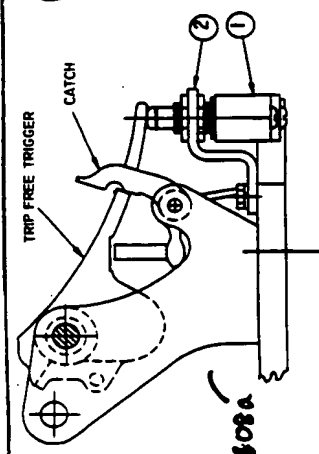
608a 608b 608c

**INSTRUCTIONS**

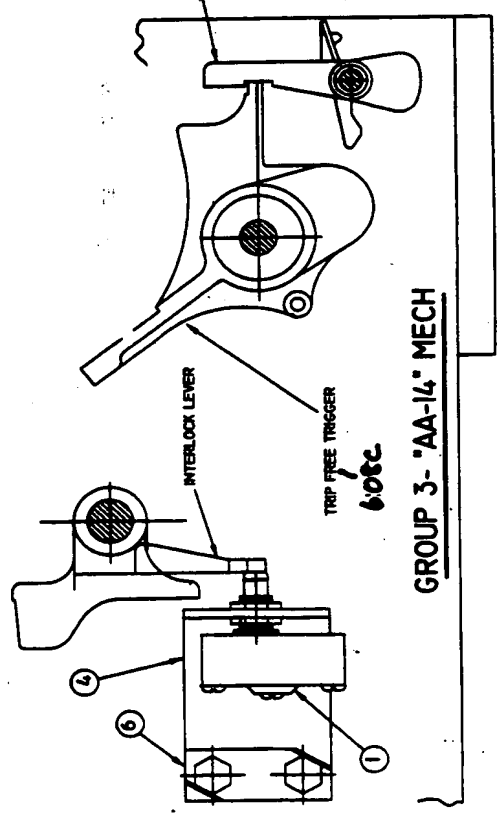
THE FUNCTION OF THE LATCH CHECK SWITCH IS TO INSURE THAT THE MECHANISM IS COMPLETELY RETURNTED AND THE TRIP FREE LATCH SYSTEM IS FULLY ENGAGED BEFORE ANY CLOSING OR RE-CLOSING OPERATION IS ATTEMPTED ELECTRICALLY.



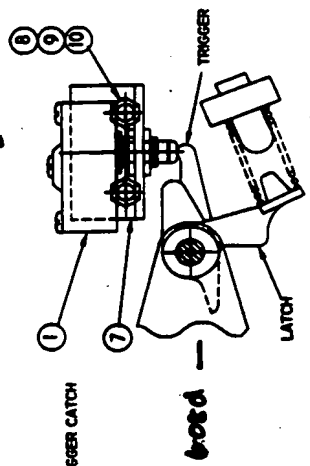
**GROUP 2 - "AA-10" MECH**



**GROUP 1 - "AA-7" MECH**



**GROUP 3 - "AA-14" MECH**



**GROUP 4 - "AH-10" MECH**

**Figure 6a**

Order form

Ordering Form

Send quotation to:

Company Name: - 620

600b

Contact Name: - 622

Shipping address: - 624

Billing Address: - 624

E-mail: - 628

Telephone: - 630

Fax: - 632

Payment: - 634

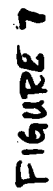
VISA, M/C, AMEX

Expiration date: - 636

Name on card - 638

Card number: - 640

FIGURE 6b



**FP-E-89-5**

**Type 2300SF15000 /17500 / 20000 & 242SF50 / 63**  
**Major Maintenance Checklist**

Station \_\_\_\_\_

Breaker I.D.# \_\_\_\_\_

Date(s) of Maintenance \_\_\_\_\_

Serviced by \_\_\_\_\_

## 1. Nameplate Data

- a. Breaker Type \_\_\_\_\_ Amp \_\_\_\_\_  
Year of Manufacture \_\_\_\_\_ I.B. \_\_\_\_\_  
Serial / S.O. \_\_\_\_\_  
b. Mechanism Type \_\_\_\_\_ I.B. \_\_\_\_\_  
Control Diagram \_\_\_\_\_ Control Voltage \_\_\_\_\_  
Compressor & Heater Voltage \_\_\_\_\_  
Operation Counter Reading as found \_\_\_\_\_ as left \_\_\_\_\_  
Air Compressor Hours \_\_\_\_\_  
c. SF<sub>6</sub> System  
Control Diagram \_\_\_\_\_ Compressor Hrs \_\_\_\_\_  
SF<sub>6</sub> Low Pressure \_\_\_\_\_ psig Temperature \_\_\_\_\_  
SF<sub>6</sub> High Pressure \_\_\_\_\_ psig Temperature \_\_\_\_\_

## 2. General Condition of Breaker

## CAUTION

**Prior to performing inspection of the breaker, trip the breaker and open adjacent breaker disconnect switches. Solidly ground all bushing top terminals to remove the residual electrical charge. (If not grounded, bushings can retain an electrical charge which may cause serious shock to a workman.) Open all A-C and D-C switches, and close the main hand-operated air shut-off valve between the air reservoir and mechanism. Bleed trapped air by depressing the manual over-ride push button on the pilot valve.**

### 3. External Checks:

### 3.1 Pre-Maintenance Tests

- a1. Leak check**

### Location of leaks found

FIGURE 8

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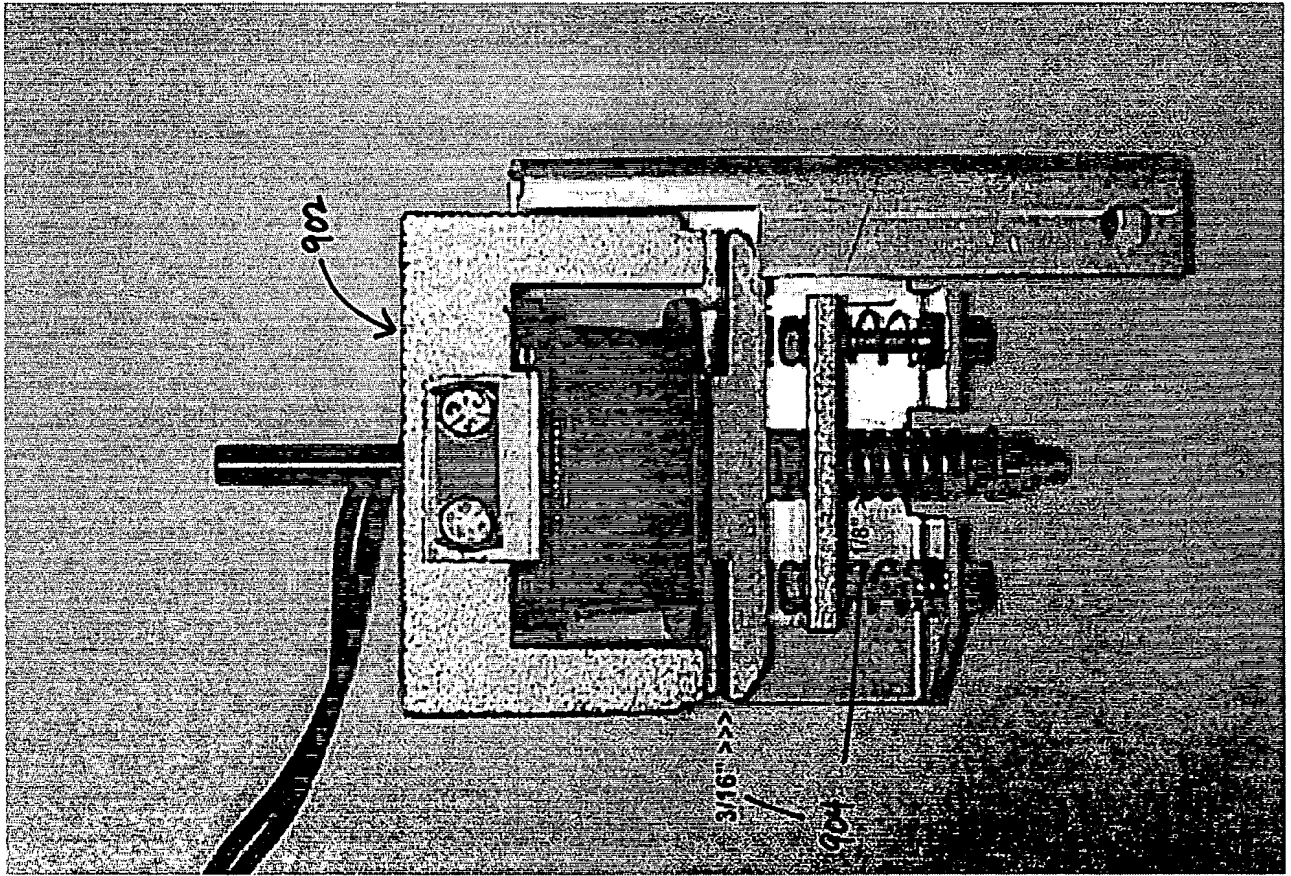


FIGURE 9